Montana Department of Environmental Quality Comments on Phase I Site Characterization Data Summary Report; Columbia Falls Aluminum Company; Columbia Falls, Flathead County, Montana (February 27, 2017)

General Comments

1.) Please identify the location of Aluminum City on appropriate site maps and figures (e.g., Figures 1 and 2, Plate 1).

2.) On the appropriate Plates and/or Figures, please identify the surface water feature that originates east of the Industrial Landfill and flows south to an area between the Industrial Landfill and the North-West Percolation Pond. Ensure that discussion of this feature, and any associated sample results, are included in the appropriate sections of the report (i.e. sections 2.11.3, 2.12, 3.6, 3.7, 4.2.2, etc.).

3.) Please add a section to the Phase I Characterization Data Summary Report summarizing all identified data gaps. Included in that summary, provide a general discussion of how missing information will be addressed in the Phase II Sampling and Analysis Plan, details on the purpose, general approach and methods for the investigation. This section should include, for example, those data gaps identified in section 3.3.2.1, a proposed method to clearly establish water-table contours in the western area of the site near Aluminum City, suggested collection of additional soil and sediment data to determine the source of contamination detected in Cedar Creek, etc.

In addition, a thorough data gap analysis must be conducted for all data summarized in Section 4. All identified data gaps must be included in the new section. While some data gaps are described in the individual area descriptions in Section 4, it is important to clearly summarize all gaps found during the Phase I evaluation.

4.) While the data collected were focused on investigating the historical operation area, it is important to also investigate where contamination may have come to exist in other areas on the site and ensure the data is spatially representative of the entire site. In order to refine the list of COPCs for the site, a more thorough investigation must be completed to identify "worst case" scenarios and identify areas of the site that may have been impacted beyond the operational footprint. At this time there is insufficient data to justify permanently removing compounds as COPCs for the site. Removing compounds prior to fully characterizing a site can lead to the elimination of potential risks. Additional investigations should be conducted within the suspected source areas until clean, non-impacted media, has been reached to better define the extent of contamination and ensure the highest concentration of each contaminant is known.

5.) Leaching to groundwater exceedances must be discussed throughout Section 4 of this document. Numerous discussions linking soil concentrations to groundwater contamination were included based on exceedances of residential and/or industrial screening levels. For example, section 4.1.2 notes that the Former Drum Storage Area may be a contributing source to elevated cyanide and fluoride in groundwater due to soil concentrations exceeding residential and industrial screening levels. These screening levels are based on direct contact and therefore do not represent the risks that soil

contaminants may or may not pose on groundwater. Please include a discussion of leaching to groundwater potential throughout Section 4 to evaluate the leaching pathway this should include any compounds that may have exceed leaching to groundwater but may not have exceed residential or industrial RSLs.

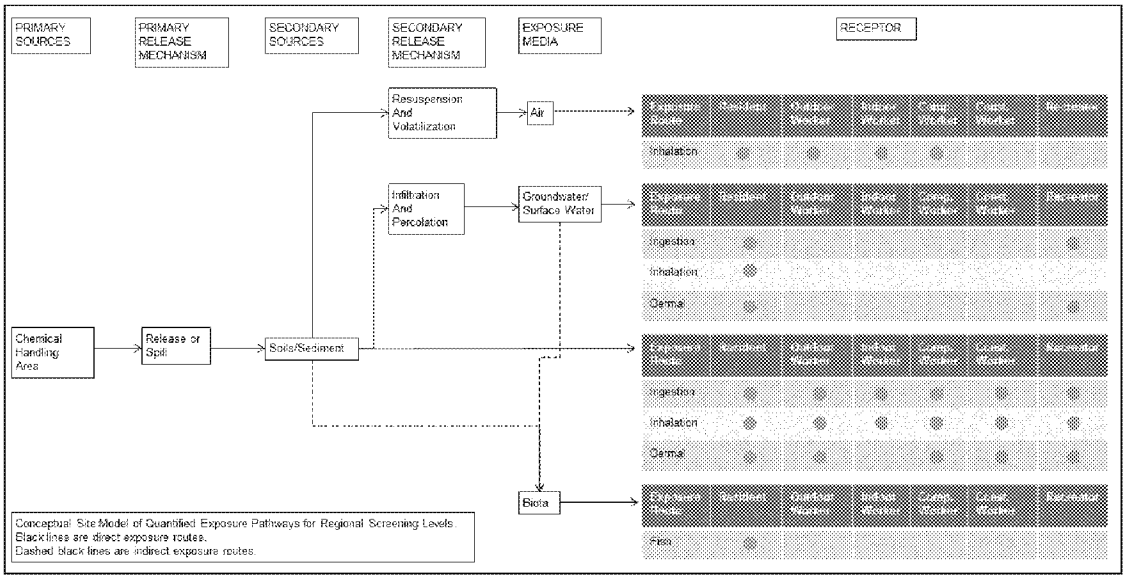
6.) A list of Phase I organic and inorganic analytes with analytical methods and screening levels should be included as a Table.

7.) Potential contamination within the Main Plant Area has not been adequately characterized. Soil and groundwater sampling should be conducted in the Main Plant Area, once the demolition project has been completed. Soil and groundwater beneath the building basements and foundations, prior to placement of fill, should also be sampled. Characterization within the Main Plant Area must be identified as a data gap and included in the data gap analysis section, per Comment 3 above.

8.) The Operational Area was sampled using a grid/composite sample approach. Sample results indicate elevated concentrations of PAHs and inorganic compounds are present greater than residential and industrial regional screening levels. Additional discrete sampling must be conducted in the Operational Area to further delineate soil contamination in surface, shallow, and at depth soils.

9.) Calbag Resources, the company conducting demolition of the aluminum facility, has taken soil, waste, and waste residue samples for demolition and waste management purposes. Sampling will also be conducted in the interior of the building and the basements as part of closure requirements. Analytical results of these samples may provide useful information.

10.) Please add a figure showing an updated Conceptual Site Model for the site. This figure should include sources, affected medium, exposure points, exposure routes, and receptors. See the example figure below.

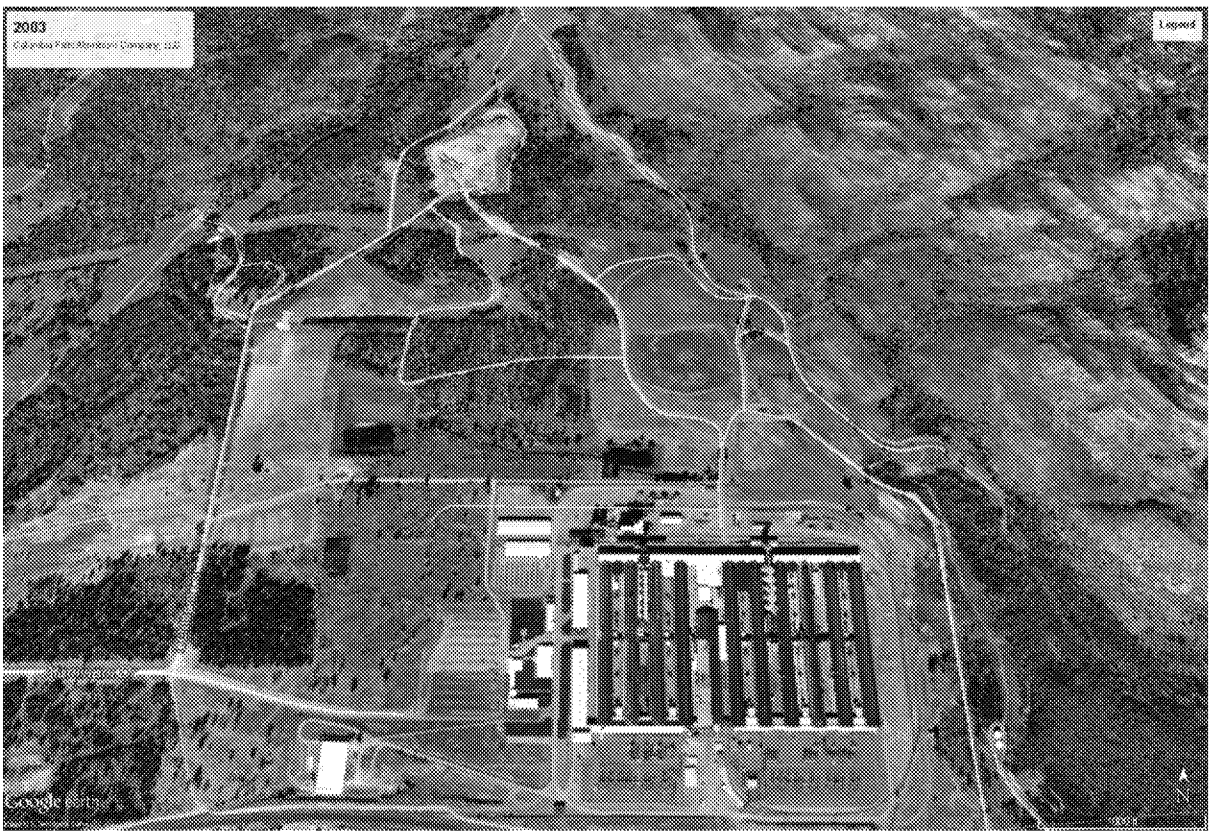


11.) The current 400 mg/kg RSL is based on the United States Department of Health and Human Services' Center for Disease Control and Prevention (CDC) and EPA's adopted 10 microgram per deciliter (µg/dL) PbB concentration of concern. In 2012, the CDC released an updated reference level for PbB of 5 µg/dL; however, the EPA has yet to adopt that level for risk assessments. In order to be protective of both adults and children in a residential scenario and minimize the possibility of having to conduct additional remedial actions to address lead, DEQ has developed a lead cleanup level of 153 mg/kg which is based upon the 5µg/dL endpoint. Please revise the lead screening level in all applicable tables and re-evaluate lead as a COPC for the site in the text where needed.

12.) Screening Levels: Please note that DEQ considers an additional or excess lifetime cancer risk of 1 in 100,000 (1×10^{-5}) an allowable risk for persons exposed to cancer-causing compounds. To help users make the appropriate adjustments to the EPA RSLs, DEQ developed a soil screening flow chart (http://deq.mt.gov/Portals/112/Land/StateSuperFund/Documents/SoilScreenFlowchart2016.pdf?ver=2016-05-19-153548-370) to evaluate direct contact and leaching to groundwater in surface and subsurface soils. Please apply the procedures outlined in this chart to determine the appropriate screening levels for soil samples at the Columbia Falls Aluminum Company Site.

13.) The samples chosen to represent background concentrations are insufficient. According to EPA's Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites "the locations of the background samples must be areas that could not have received contamination from the site". The samples collected for background comparisons were collected from an area within site boundaries, and adjacent to known sources of contamination (North Percolation Pond Area & the Industrial Landfill) where wind, runoff or other activities could have had a negative impact on the area. Google Earth also shows evidence of the area being used during operations (presence of a building in 1991 imagery) and previously disturbed by human activity in 2003 and 2004 (see images below). Please conduct preliminary screening of metals using background concentrations provided in the DEQ Background Concentrations of Inorganic Constituents in Montana Surface Soils (http://deq.mt.gov/Portals/112/Land/StateSuperfund/Documents/InorganicBackground/BkgdInorganicsReport.pdf). A more appropriate site-specific background evaluation may be conducted at a future date if needed.


1991
Legend
Google earth
N


2003
Legend
Google earth

Specific Comments

Section 1.1, page 2: As part of site background and historical information in support of the site conceptual model, please describe the nature and use of the of the rectangular re-forested areas visible on aerial photos and located northwest of the northeast Percolation Pond and southwest of Former Drum Storage Area, and the rectangular re-forested area west of Main Plant Area.

Section 2.4.4.1, page 8 – Landfill Soil Gas Screening: Field screening for soil gas was not conducted at the East Landfill. Please include a statement in this section explaining why.

Section 2.10.2, page 17: Please provide all asbestos test pit logs, including any photos or other field notes, and a copy of the asbestos report submitted by Hydrometrics.

Section 2.12: Discussion on the depth of sediment sampling along the river should be included in the report. There may be a significant data gap if sediment sampling was not conducted within the hyporheic zone.

Section 2.12, page 24: Include reference to the sediment samples (CF-SDP-021 and 022) collected from sediment associated with the surface water feature referred to as the Northern Surface Water Feature in Section 2.11.3. These sample locations are indicated on Plate 5, but the samples are not reflected on Table 5 and results are not indicated in Appendix Y. Please describe why these samples were collected, but no results reported.

Section 3.3.2, page 36: Provide a description and discussion of the surface water feature indicated on numerous Plates and Figures (e.g., Plates 1 and 2, Figures 2 and 3) apparently originating east of the Industrial Landfill and flowing south to an area between the Industrial Landfill and the North-West Percolation Pond. Include any information known regarding the source and historical diversion of flow (i.e. it appears to have been diverted into a ditch flowing west to Cedar Creek).

Section 3.3.2.4, page 42: Please reference Plate 12 in this section, as the discharge measurement points are shown on this figure.

Section 3.4.1, page 46, 1st paragraph on page: Please note that any leaching to groundwater exceedances must be investigated even if the compound was not found in groundwater or exceeded EPA RSLs. At this stage in the investigation any future potential for a compound to leach should be recorded and evaluated further. Leaching can often drive the clean-up levels for certain compounds at a site as well as future remedial action alternatives. It is permissible to adjust the EPA RBSSL using the flow chart provided in General Comment 12 above as well as background concentrations provided in General Comment 13. Please include a statement indicating that all leaching to groundwater exceedances will be carried forward and evaluated further.

Section 3.4.1.3, page 48 – Site-Wide Metals, second bullet: Refer to the General Comment above regarding the appropriate screening level for lead. The EPA regional screening level (RSL) for lead is 400 mg/kg. In 2012, the CDC released an updated reference level for lead blood (PbB) concentration of 5 microgram per deciliter (µg/dL); however, the EPA has yet to adopt that level for risk assessments. DEQ

developed a lead cleanup level of 153 mg/kg, based on the 5 µg/dL endpoint. DEQ uses this new lead level in risk assessments in order to be protective of both adults and children in a residential scenario and to minimize the possibility of additional remedial actions in the future to address lead.

Section 3.4.1.4, page 48: The methodology for calculating Toxicity Equivalent Factors (TEFs) in the referenced documents (EPA "Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessment) has not been applied correctly. The assigned TEF values for individual compounds should be multiplied by the concentration of the individual congener (see Equation 1 of the reference EPA document). The TEQ is then calculated by summing these products. This TEQ value is then evaluated using TCDD dose-response data and used to assess the risk. DEQ developed a DEQ Dioxin/Furan calculator applying the referenced equations. Please rescreen all Dioxin/Furan data using this calculator and the referenced methodology to ensure the screening process is properly conducted (http://deq.mt.gov/Land/statesuperfund/teqs).

Section 3.4.1.4, page 48 – Dioxins (PCDDs) and Dibenzofurans (PCDFs): According to the RI/FS Work Plan, releases of PCBs occurred in the Rectifier Yards as a result of spills and transformer fires in 1991 and 1994. It appears, from the Phase I Report, that samples from the Rectifier Yards were analyzed for PCDDs and PCDFs; no PCB compounds were evaluated. PCB analysis of soil in the Rectifier Yards must be conducted, or additional information should be included in this section stating the reasons for not analyzing samples for PCBs.

Section 3.4.2.2, page 52 – Operational Area PAHs: Composite sampling indicates presence of PAHs in surface and shallow soils greater than residential and industrial screening levels. Additional sampling should be conducted to identify extent and magnitude of PAHs in soils. This information may be most appropriately discussed in a new section where data gaps and plans for additional Phase II sampling are summarized.

Section 3.4.3, page 55 – Drainage Structure Soil Quality: For clarity, the location of the drainage structures should be included in this section. Analytical results should be shown on a corresponding map, in addition to the analytical results tables.

Section 3.4.4, page 57 – Background Area Soil Quality: Also refer to the General Comment above regarding background sampling locations. Background samples indicate some PAH concentrations above USEPA Residential RSLs. While the location chosen for background samples may be upwind of historical plant emissions for prevalent westerly wind patterns, the location does experience air inversions and likely down-river east winds. Information on PAH concentrations outside the main areas of plant activities may be useful. However, air deposition of PAHs in soils from aluminum production is common and should be considered in any evaluation of PAH concentrations in background soil samples. If background PAH samples are necessary for evaluation, alternative samples should be taken that are at locations outside the area influenced by air deposition.

Section 3.5.2.1: Due to the high exceedances of cyanide and fluoride near the West Landfill/Former Drum Storage Area, DEQ would recommend the installation of at least one additional well directly downgradient from the from the Former Drum Storage Area. This information may be most

appropriately discussed in a new section where data gaps and plans for additional Phase II sampling are summarized.

Section 3.5.2.1: Discussion on the speciation of cyanide in groundwater should be included in this report. If speciation of cyanide in groundwater has not been investigated, discussion should be included as to why it is not necessary.

Section 3.4.5, page 62, 2nd paragraph: The referenced tables in Appendix L (L25 and L30) do not appear to include VOC and SVOC results for the soil samples from the 0-0.5 ft interval. Ensure these results are included on the tables and in the surface soil quality evaluation discussions for the borrow area, as this interval has been stockpiled and will be replaced on the surface in this area of the site.

Section 3.4.5, page 63, last paragraph, last sentence: Refer to the comment above regarding future replacement of surface soils in the borrow area. Although surface soils will not be used as borrow material, the results must be included in the soil quality evaluation, as these sample results provide characterization data for surface soils in this area of the site.

Section 3.4.5, page 64: Please include a column in this table with Mean concentrations for metals from the soil 0-0.5 ft samples, as this soil has been stockpiled and will be replaced/remain on site in the borrow area. These soil results provide characterization data for surface soils in this area of the site.

Section 3.5.2, page 69: Previous planning documents (RI/FS Work Plan, Phase I SAP, or Phase I SAP Addendum) did not indicate that the VISL calculator would be used to evaluate soil vapor or soil gas samples. The only screening values mentioned were EPA RSLs (pg. 62 RI/FS Work Plan). The VISL calculator includes generic attenuation factors such as 0.03 for subslab to indoor air. It also includes chemical-specific attenuation factors for groundwater to indoor air. DEQ has not determined that these attenuation factors are appropriate for general use. The VISL also includes a risk calculator that does explicitly account for cumulative risks and that should not be used for a building by building risk calculation. Please evaluate the soil vapor and/or soil gas sample results against the EPA RSLs, as described on p. 62 of the RI/FS Work Plan. The results of this evaluation should also be included in Section 4.2.3.

Section 3.7, page 24: Refer to comment for section 2.12 above and describe why results are not included for sediment samples CF-SDP-021 and CF-SDP-022.

Section 4.1.3, page 86:

a. 2nd paragraph – Soils at depth should also be compared to leaching to groundwater screening levels to evaluate the potential for contaminants to impact groundwater. Please include a discussion of leaching to groundwater. Refer to General Comment 5 above.
b. 4th paragraph – Please include a discussion of leaching to groundwater exceedances, if any, in soil samples within the Northwest and Northeast Percolation Pond. Please remove the statement noting the Northwest and Northeast Percolation Ponds

"effectively prevent migration of SVOC's from the ponds to groundwater" or provide evidence that the ponds were engineered and constructed to prevent leaching to groundwater. If leaching to groundwater screening levels are exceeded and there is no other evidence (presence of pond liners, etc.) to suggest that these ponds were constructed to "prevent migration of SVOC's to groundwater" then the potential for future leaching should be evaluated.

Section 4.1.4, page 87, 1st paragraph: It would be helpful to reference a figure in this section that indicates the locations of the drywells/drainage structures and the ASTs and USTs referenced, as well as the associated sampling locations. In addition, refer to General Comment 3 above, and describe whether additional sampling is needed to fully identify and characterize the contaminant sources in these areas. This information may be most appropriately discussed in a new section where data gaps and plans for additional Phase II sampling are summarized.

Section 4.1.5, page 89, 2nd paragraph, last sentence: The sentence states that free cyanide analysis will be included in future sampling events to address the uncertainty between total cyanide analysis and free cyanide analysis due to potential metal-cyanide complexes. To obtain the concentration of strong metal-cyanide complexes, free cyanide and weak acid dissociable (CNwad) concentrations should be subtracted from the total cyanide concentration. In addition, thiocyanates are not part of the total cyanide concentration (Gagnon, et. al.).

Section 4.1.5.1, page 89, second paragraph on page: If VOCs exceeded soil screening levels, including leaching to groundwater, then they should be retained as COCs for the site and evaluated further in the Baseline Risk Assessment. Please include a discussion of leaching to groundwater and retain those compounds that exceed EPA RSLs or leaching screening levels as COCs.

Section 4.1.5.2, page 90: Please refer to General Comment 13 above regarding site specific background concentrations.

Section 4.2, Page 91: Are there plans to evaluate areas downwind of property boundary? Please provide a discussion of any plans to complete an evaluation of downwind properties. This information may be most appropriately discussed in a new section where data gaps and plans for additional Phase II sampling are summarized.

Section 4.2.1, page 93, last paragraph: Although PAHs were not seen above Groundwater standards the potential for future leaching should be noted. Please include a statement that the potential for PAHs to leach to groundwater will be investigated and evaluated further during the Phase II investigation and Baseline Risk Assessment.

Section 4.2.1, Page 92, second paragraph and Section 4.2.2, Page 95, last paragraph: Include a discussion of the quarterly data collected from Aluminum City as referenced in this section. Include information regarding the sampling methods and a table indicating sample results.

Section 4.2.1, Page 93, first paragraph: Please add figures showing arsenic, lead, aluminum, cobalt, and iron contours to illustrate this discussion.

Tables 21 and 22: Table 21 and 22 include columns labeled "CFMW-001 Standard". CFMW-001 is a background value and should not be confused with a determined standard. Please remove the term 'standard' from the CFMW-001 columns.

Figure 2. The plant drainage structures described in the RI/FS Work Plan and in Sections 2.4.5 and 3.4.3 of the Phase 1 Report should be shown on Figure 2 or on a separate map.

Plate 2: Please include the sample locations and designations for all soil gas samples to help interpret analytical data and field data sheets.

Appendix C "Field Data Sheets", Soil Gas Screening, Soil Gas Sampling Sheet dated 4/21/2016: Notes were added to the 2nd page of the sampling sheet indicating the presence of black soil and black sludge at about 1 ft bgs. Please provide the location of samples CFSGS-011 to CFSGS-013 and provide text within the report explaining what, if anything was done to further investigate the presence of this sludge material.

References

Gagnon, I., Zagury, G., and Deschênes, L. (2004). Natural Attenuation Potential of Cyanide Near a SPL Landfill. *Proceedings of the 8th International Symposium on Environmental Issues and Management of Waste in Energy and Mineral Production SWEMP* (p.p. 451-456) Ankara, Turkey. http://www.polymtl.ca/enviro-geremi/pdf/articles/Paper_Gagnon_Zagury_et_al_Jan_15_2004%20.pdf